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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,867	06/28/2006	David A. Fish	GB040005	1716
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EXAMINER				
BOLOTIN, DMITRIY				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/596,867

**Applicant(s)**

FISH ET AL.

**Examiner**

Dmitriy Bolotin

**Art Unit**

2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/US)
- Paper No(s)/Mail Date 04/02/2008
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

### DETAILED ACTION

It would be of great assistance to the Office if all incoming papers pertaining to a filed application carried the following items:

1. Application number (checked for accuracy, including series code and serial no.).
2. Group art unit number (copied from most recent Office communication).
3. Filing date.
4. Name of the examiner who prepared the most recent Office action.
5. Title of invention.
6. Confirmation number (See MPEP § 503).

### *Claim Objections*

1. **Claims 5 – 7, 9, 11 – 13, 19 – 21** filed on 03/18/2009 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim *should refer to other claims in the alternative only*. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claim 18** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. The recitation of claim 18, particular, the recitation "**substantially immediately**" is not a definite range of time. It is not clearly defined what the word "immediately" means?

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. **Claims 1 – 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (hereinafter PA) in view of Oh (US 7,277,071).

As to **claim 1**, PA discloses an active matrix device comprising an array of display pixels (pixels 1 of fig. 1), each pixel comprising: a current driven light emitting display element (electroluminescent elements 2 of fig. 1); a drive transistor (TD of fig. 3) for driving a current through the display element (element 2 of fig. 1); first and second capacitors (C1 and C2 of fig. 3) connected in series between the gate (G of fig. 3) and source (S of fig. 3) of the drive transistor (TD of fig. 3), a data input to the pixel (supplied by line 6 of fig. 3) being provided to the junction (junction 30 of fig. 3) between the first and second capacitors (C1 and C2 of fig. 3) thereby to charge the second capacitor (C2 of fig. 3) to a voltage derived from the pixel data voltage (page 7, lines 7 – 12), and a voltage derived from the drive transistor threshold voltage being stored on the first capacitor (C1 of fig. 1, page 7, lines 7 – 12).

PA fails to disclose a discharge transistor connected between the junction between the first and second capacitors and a common line for all pixels of the display.

In the same field of endeavor, Oh discloses a discharge transistor (M4 of fig. 6) connected between the junction between the first and second capacitors (between capacitors Cst and Cvth of fig. 6) and a common line (Vdd of fig. 6) for all pixels of the display.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of PA by adding a transistor disclosed by Oh, so as to correct for the deviation of the threshold voltage of a TFT driving transistor and to present uniform brightness (Oh, col. 2, lines 60 - 64).

As to **claim 2** (dependent on 1), PA discloses a device, wherein the drive transistor (TD of fig. 3) comprises a p-type thin film transistor (p-type TFT, Page 3, line 10).

As to **claim 3** (dependent on 1), PA discloses a device, wherein the drive transistor (TD of fig. 3) comprises a polysilicon transistor (polysilicon TFT, page 3, lines 10 – 11).

As to **claim 4** (dependent on 3), PA discloses a device, wherein the drive transistor (TD of fig. 3) comprises a low temperature polysilicon transistor (low temperature polysilicon TFT, page 3, lines 10 – 11).

As to **claim 5** (dependent on 1), PA discloses a device, wherein each pixel further comprises an input transistor (A1 of fig. 3) connected between an input data line (6 of fig. 3) and the junction (30 of fig. 3) between the first (C1 of fig. 3) and second capacitors (C2 of fig. 3).

As to **claim 6** (dependent on 1), PA discloses a display device, but fails to disclose that each pixel is operable in two modes, a first mode in which the input transistor is off and the voltage derived from the drive transistor threshold voltage is stored on the first capacitor, and a second mode in which the input transistor is on and a data input to the pixel charges the second capacitor to the voltage derived from the pixel data voltage.

In the same field of endeavor, Oh discloses that each pixel is operable in two modes, a first mode in which the input transistor (M3 of fig. 6) is off and the voltage

derived from the drive transistor threshold voltage is stored on the first capacitor (Cvth of fig. 6) (col. 6, lines 50 – 64), and a second mode in which the input transistor (M3 of fig. 6) is on and a data input to the pixel charges the second capacitor (Cst of fig. 6) to the voltage derived from the pixel data voltage (col. 6, line 64 – col. 7, line 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of PA by operating the pixel in two modes as disclosed by Oh, so as to correct for the deviation of the threshold voltage of a TFT driving transistor and to present uniform brightness (Oh, col. 2, lines 60 - 64).

As to **claim 7** (dependent on 1), PA discloses a device, wherein the drive transistor (TD of fig. 3) is a p-type transistor (p-type TFT, Page 3, line 10) and the source of the drive transistor (S of fig. 3) is connected to a power supply line (26 of fig. 3).

As to **claim 8** (dependent on 7), PA discloses a device, wherein the common line comprises the power supply line (26 of fig. 3).

As to **claim 9** (dependent on 1), PA discloses a device, wherein each pixel further comprises a second transistor (A2 of fig. 3) connected between the gate (G of fig. 3) and drain (D of fig. 3) of the drive transistor (TD of fig. 3).

As to **claim 10** (dependent on 9), PA discloses a device, wherein the second transistor (A2 of fig. 3) is controlled by a first gate control line which is shared between a row of pixels (A1 to A3 are controlled by respective row conductors, page 7, lines 21 – 26).

As to **claim 11** (dependent on 1), PA discloses a device, wherein the first and second capacitors (C1 and C2 of fig. 3) are connected in series between the gate (G of fig. 3) and source (S of fig. 3) of the drive transistor (TD of fig. 3).

As to **claim 12** (dependent on 1), PA discloses a device, wherein each pixel further comprises a third transistor (A3 of fig. 3) connected between the drive transistor (TD of fig. 3) and the display element (2 of fig. 3).

As to **claim 13** (dependent on 1), PA discloses a device, wherein the display element (2 of fig. 3) comprises an electroluminescent display element (page 2, lines 4 – 9).

As to **claim 15**, PA discloses a method of driving an active matrix display device comprising an array of current driven light emitting display pixels (1 of fig. 1), each pixel comprising an display element (2 of fig. 1) and a drive transistor (TD of fig. 3) for driving a current through the display element, the method comprising, for each pixel: isolating a data line (6 of fig. 3) from the pixel (transistor A1 is off), and coupling a data line (6 of fig. 3) to the pixel, and while the data line is coupled: charging a second capacitor (C2 of fig. 3), in series with the first capacitor (c1 of fig. 3) between the gate (G of fig. 3) and source (S of fig. 3) of the drive transistor (TD of fig. 3), to a data input voltage from the data line (6 of fig. 3) (page 8, lines 23 – 24); and using the drive transistor (TD of fig. 3) to drive a current through the display element (2 of fig. 3) using a gate voltage that is derived from the voltages across the first and second capacitors (C1 and C2 of fig. 3) (page 8, line 25).



PA fails to disclose that while the data line is isolated: driving a current through the drive transistor, and charging a first capacitor to a resulting gate-source voltage; discharging the first capacitor through a discharge transistor connected between one terminal of the first capacitor and a common line, until the drive transistor turns off, the first capacitor thereby storing a threshold voltage.

In the same field of endeavor, Oh discloses that while the data line is isolated (M3 transistor is off, col. 6, lines 50 – 64): driving a current through the drive transistor (col. 6, lines 50 – 64), and charging a first capacitor (Cvth of fig. 6) to a resulting gate-source voltage (threshold voltage of transistor M1 of fig. 6, col. 6, lines 50 – 64); discharging the first capacitor (Cvth of fig. 6) through a discharge transistor (M4 of fig. 6) connected between one terminal of the first capacitor (Cvth of fig. 6) and a common line (Vdd of fig. 6), until the drive transistor turns off, the first capacitor (Cvth of fig. 6) thereby storing a threshold voltage (col. 6, lines 50 – 64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of PA by driving a discharge transistor disclosed by Oh, so as to correct for the deviation of the threshold voltage of a TFT driving transistor and to present uniform brightness (Oh, col. 2, lines 60 - 64).

As to **claim 16** (dependent on 15), PA discloses a method, wherein the isolating and coupling comprises switching an address transistor (A1) connected between the data line (6 of fig. 3) and an input (30 of fig. 3) to the pixel (A1 is used as a switch, page 8, lines 1 – 3).

As to **claim 17** (dependent on 16), PA discloses a method, wherein the address transistor (A1 of fig. 3) for each pixel in a row is switched on simultaneously by a common row address control line (row conductor 4 of fig. 1).

As to **claim 18** (dependent on 17), PA discloses a method, wherein the address transistors (A1 of fig. 3) for one row of pixels are turned on substantially immediately after the address transistors for an adjacent row are turned off (inherently OLED displays are scanned one row at a time by tuning on current row ones previous row is turned off).

As to **claim 19** (dependent on 15), PA discloses a method of driving a pixel, but fails to disclose that when the data line (6 of fig. 3) is isolated from the pixel (2 of fig. 3) and the first capacitor (C1 of fig. 3) is being charged, the data line is used to provide a data input voltage to another pixel associated with the data line.

In the same field of endeavor, Oh discloses that when the data line (Data of fig. 6) is isolated from the pixel (OLED of fig. 6) and the first capacitor (Cvth of fig. 6) is being charged (col. 6, lines 50 – 64), the data line is used to provide a data input voltage to another pixel associated with the data line (previous scan line is on, and the data is applied to the pixel, col. 6, line 50 – col. 7, line 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of PA by driving the pixel as disclosed by Oh, so as to correct for the deviation of the threshold voltage of a TFT driving transistor and to present uniform brightness (Oh, col. 2, lines 60 - 64).

As to **claim 20** (dependent on 15), PA discloses a method, for driving a display device in which each pixel comprises a p-type drive transistor (p-type TFT, Page 3, line 10).

As to **claim 21** (dependent on 15), PA discloses a method, for driving a display device in which the drive transistor (TD of fig. 3) comprises a polysilicon transistor (polysilicon TFT, page 3, lines 10 – 11).

As to **claim 22** (dependent on 21), PA discloses a method as, for driving a display device in which the drive transistor (TD of fig. 3) of each pixel comprises a LTPS transistor (low temperature polysilicon TFT, page 3, lines 10 – 11).

8. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over PA in view of Oh and Thompson et al. (US 6,863,997).

As to **claim 14** (dependent on 13), PA in view of Oh discloses a device, heaving the electroluminescent (EL) display element (2 of fig. 3), but fails to disclose that EL element comprises an electrophosphorescent organic electroluminescent display element.

In the same field of endeavor, Thompson discloses electroluminescent display elements comprising an electrophosphorescent organic electroluminescent display element (col. 3, lines 30 – 36).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display element of PA in view of Oh by incorporating electrophosphorescent organic electroluminescent display element, since these element demonstrate high internal quantum efficiencies (Thompson, col. 3, lines 30 – 36)

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dmitriy Bolotin whose telephone number is (571)270-5873. The examiner can normally be reached on Monday-Friday, 8:00 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amare Mengistu can be reached on (571)272-7674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. B./  
Examiner, Art Unit 2629

/Amare Mengistu/  
Supervisory Patent Examiner, Art Unit 2629